

1                   **RF CONVERTER HAVING MULTIPLE AV/S TERMINALS**

2    **BACKGROUND OF THE INVENTION**

3    1. Field of the Invention

4                   The present invention is related to a radio frequency (RF) converter having  
5    multiple AV/S terminals, and more particularly to an RF converter that converts one  
6    AV/S signal from one of the multiple AV/S terminals to one RF signal to input into an  
7    antenna terminal of a monitor such as a TV.

8    2. Description of Related Art

9                   In the past, TV devices have an antenna (ANT) terminal to be connected to an  
10   antenna. The antenna receives the wireless signal including video and audio  
11   components and inputs the signal to the ANT terminal through a line.

12                  As video/audio memories have developed, many kinds of video/audio players  
13   have been designed to read and play the data from the corresponding video/audio disks,  
14   such as VCD, DVD, etc. The latest video/audio players have different output terminals  
15   such as AV terminals and S terminals to transmit the video/audio data from the players  
16   to the TV where the data is presented to the viewer. If the TV is an old type, the TV can  
17   not show that data on it. Therefore the older model TVs can not adapt to the present  
18   video/audio players.

19                  To connect older model TVs to the new video/audio terminal types a converter  
20   has designed. The converter connects the AV/S terminals to the ANT terminal of the TV.  
21   That is, the converter converts the AV/S signal to an RF signal and then inputs the RF  
22   signal into the ANT terminal. The converter usually provides one AV input and one RF  
23   output, so the converter can only be attached to and used with one AV player at a time.  
24   Since the converter cannot be attached to at least two AV players simultaneously, the

1 user has to attach the two terminals of the two different AV players individually.  
2 Therefore the converter is still inconvenient to adapt to multiple AV players.  
3 Therefore, an objective of the present invention is to provide an improved  
4 converter to simultaneously accommodate multiple AV/S terminals to mitigate and/or  
5 obviate the aforementioned problems.

6 **SUMMARY OF THE INVENTION**

7 The main objective of the present invention is to provide an RF converter  
8 having multiple AV/S terminals that allows lots of AV players to be simultaneously  
9 connected to the converter and then connect the selected player to the ANT terminal of  
10 the TV through the converter.

11 Other objectives, advantages and novel features of the invention will become  
12 more apparent from the following detailed description when taken in conjunction with  
13 the accompanying drawings.

14 **BRIEF DESCRIPTION OF THE DRAWINGS**

15 Figs. 1A ~1F are collectively the circuit diagram of a converter in accordance  
16 with the present invention; and

17 Fig. 2 shows multiple AV players connected through the converter to a TV.

18 **DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT**

19 With reference to Fig. 2, an RF converter (10) has multiple input ports, which  
20 are AV/S terminals and one ANT terminal, connected to corresponding AV/S output  
21 ports of AV players (31) and an output port that is an RF output port connected to an  
22 ANT input port of a TV (30).

23 With reference to Figs.1A to 1F, the RF converter (10) further comprises an RF  
24 modulator (11), an S to AV signal converting unit (13), a switching unit (12), a detecting

1 unit (17) and a power circuit (18).

2 The RF modulator (11) having one video input (V), one audio input (A) and one  
3 RF output (21) converts an audio signal (A-signal) and video signal (V-signal) to an  
4 RF-signal, as shown in Fig. 1F.

5 With reference to Figs. 1A, 1C, 1D, 1E and 1F, the S to AV signal converting  
6 unit (13) connected to the video input (V) of the RF modulator (11) converts an S-signal  
7 to a V-signal. The S to AV signal converting unit (13) has an RC parallel tuner C24, L5  
8 and an RC serial tuner C25, L6. That is, an S terminal has a Y pin connected to an input  
9 of the RC parallel tuner C24, L5 and a C pin connected to an input of the RC serial tuner  
10 C25, L6. The outputs of the two tuners connect together and connect together to the  
11 video input (V) of the RF modulator (11) through a transistor Q10. Therefore, the S-  
12 signal from the S terminal is converted to a V-signal by the S to AV signal converting  
13 unit (13), and then is input to the V-pin of the RF modulator (11) through transistor Q10.

14 With reference to Figs. 1A and 1B, the switching unit (12) has multiple switches  
15 SW1~SW4 connected to corresponding AV/S terminals (20a)~(20d). The switch (SW1,  
16 SW2, SW3 or SW4) selected determines which one of the AV/S terminals (20a)~(20d)  
17 is to be input to the V pin of the RF modulator (11). Each AV terminal (20a, 20b, 20c or  
18 20d) has a V pin, an R pin and an L pin. In each of the AV/S terminals (20a)~(20d), a  
19 ground of the Y pin connects to the V pin of the AV terminal (20a, 20b, 20c or 20d)  
20 through a priority switch (201, 202, 203 or 204). Converting the S-signal from the S  
21 terminal to the RF-signal has priority over the AV-signal from the AV terminal, when  
22 both the AV terminal and the S terminals are connected to corresponding AV/S output  
23 ports of the AV player (not shown). That is, if the S output port of the AV players (not  
24 shown) connected to the S terminal by a plug, the priority switch (201)~(204) is closed,

1 which connects the signal line of the V pin to the ground of the Y pin so any V-signal  
2 from the V pin is shorted to ground.

3 With reference to Figs. 1C and 1D, each of the switches (201)~(204) connects  
4 the AV/S terminals (20a)~(20d) with the V pin and the A pin of the RF modulator.

5 However, before the AV/S terminals (201)~(204) connect to the audio input (A) and  
6 video input (V) of the RF modulator (not shown), the Y pin and the C pin of the S  
7 terminal and the V pin of each AV terminal respectively connect to three video signal  
8 amplifiers (14a)~(14c) that in turn connect to three impedance matching units  
9 (16a)~(16b). The R and L pins of each AV terminal respectively connect to two audio  
10 signal amplifiers (15a)(15b), and the outputs of the two audio signal amplifiers  
11 (15a)(15b) connect together to the audio input (A) of the RF modulator (11), as shown  
12 the Fig. 1F.

13 With reference to Figs. 1C, 1E and 1F, the detecting unit (17) is connected  
14 among the transistor Q10, a power pin (B+) of the RF modulator (11) and the ANT input  
15 (22). An electronic switch (19) is connected between the ANT input (22) and the RF  
16 output (21) to provide a direct path for an antenna signal when an ANT plug is  
17 connected to the ANT input (22). The detecting unit (17) comprises a first transistor Q8,  
18 a second transistor Q9 and a driver (171) connecting the first transistor Q8 to the  
19 electronic switch (19) of the ANT input (22). The electronic switch (19) connecting the  
20 ANT input (22) to the RF output (21) of the RF modulator (11) is two diodes (D4, D5).

21 Referring to Figs. 1A~1F, when the AV/S terminals (20a)~(20d) are connected  
22 to AV players, the user uses the switching unit (12) to turn on one of the AV/S terminals  
23 (20a)~(20d) so the appropriate RF-signal is output through the RF output (21). For  
24 example, when the first switch SW1 is turned on, the V-signal from the V1 pin of the

1 first AV terminal inputs to the video signal amplifier (14c) to amplify the video signal,  
2 thereafter inputs to the video input (V) of the RF modulator (11) through the impedance  
3 matching unit (16c). Because the transistor Q1 turns on, the V-signal from the matching  
4 impedance unit (16c) inputs to the video input (V) of the RF modulator (11).

5 The A-signal from the R1 pin and L1 pin of the first AV terminal inputs to the  
6 audio signal amplifier (15a) (15b) to amplify the audio signal, which is thereafter input  
7 to the audio input (A) of the RF modulator (11). When the RF modulator (11) gets the  
8 A-signal and the V-signal, they are converted to the RF signal.

9 If the first S terminal connects to an S-signal output of an AV player (not shown),  
10 any video signal connected to the AV terminal will be shorted to ground because the  
11 priority switch (201) is connected between ground and the V1 pin of the AV terminal.  
12 Consequently, the S-signal is converted to a V-signal by the S to AV signal converter  
13 (13). The transistor Q10 turns on to let the video signal input to the video input (V) of  
14 the RF modulator (11). At the same time, the first and second transistor (Q8, Q9) of the  
15 detecting unit (17) turn on, so that the power from a power circuit (18) is supplied to the  
16 RF modulator (11) through the second transistor Q9. Thereafter the video signal is  
17 converted to the RF-signal by the RF modulator (11). The present invention is able to  
18 provide multiple AV/S terminals (20a)~(20d) is able to simultaneously connect to  
19 multiple devices. Controlling the switching unit (12) determines which one of the  
20 multiple AV/S terminals (20a)~(20d) to connect to the ANT input of the TV (not shown).  
21 Besides, when none of the S terminals inputs a signal to the RF modulator (11), the  
22 transistor Q10, the first transistor Q8 and the second transistor Q9 turn off. The driver  
23 (171) outputs a high level voltage to make the electronic switch (19) turn on. Therefore  
24 the power of the power circuit (18) does not have to be supplied to the power pin (B+) of

1 the RF modulator (10), and the RF-signal from the ANT input (22) is directly output to  
2 the RF output (21) through the electronic switch (19).

3 The RF converter (10) not only adapts to multiple AV/S terminals (20a)~(20b),  
4 but also has an ANT input (22) to directly connect an ANT plug. To use the present  
5 invention, the user only has to connect all AV/S output ports of the AV plays by the  
6 plugs to the corresponding AV/S terminals (20a)~(20d) of the RF converter (10). Then  
7 the user operates the switches SW1~SW4 to chose the specific switch SW1~SW4 to  
8 allow the corresponding AV-signal or S-signal from the AV/S terminal (20a)~(20d) to  
9 be converted by the RF modulator (11). Then the RF-signal is output through the RF  
10 output (21).

11 It is to be understood, however, that even though numerous characteristics and  
12 advantages of the present invention have been set forth in the foregoing description,  
13 together with details of the structure and function of the invention, the disclosure is  
14 illustrative only, and changes may be made in detail, especially in matters of shape, size,  
15 and arrangement of parts within the principles of the invention to the full extent  
16 indicated by the broad general meaning of the terms in which the appended claims are  
17 expressed.